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L. C. Hanson
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FINAL REPORT
SAND COULEE, PHASE II
SAND COULEE, MONTANA

OCTOBER 1985

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FINAL REPORT
SAND COULEE, PHASE II
SAND COULEE, MONTANA

OCTOBER 1985

ATTENTION: Mr. Richard Juntunen, Chief
Abandoned Mine Reclamation Bureau
Department of State Lands
1625 11th Avenue
Helena, Montana 59620

PREPARED BY: L. C. Hanson Company
Consulting Engineers
PO Box 299
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James E. Hodges, P.E.
Project Engineer

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L. C. HANSON COMPANY
CONSULTING ENGINEERS & SURVEYORS
HELENA — GREAT FALLS — GLENDIVE

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SAND COULEE PHASE II

OBJECTIVE:

The goals of this project were to close mine openings thereby preventing entry by both people and runoff water; to reconstruct the Mining Coulee channel; to remove the existing dam and pond containing acid mine drainage and sludge; and to reclaim all excavated areas and areas disturbed by disposal of coal wastes and excavated materials.

PROJECT LOCATION:

The project site is located in Mining Coulee, just south of the town of Sand Coulee, Cascade County, Montana.

SURFACE DESCRIPTION:

Most of the site was formerly a landfill operated by Cascade County for area residents. The previous Sand Coulee Heal project covered the landfill with coal slack and reconstructed the lower 1200 linear feet of the coulee channel. The channel reconstruction ended at a closed adit which had acid mine drainage seeping from it. Drainage from this adit flowed both into the reconstructed channel and into a channel along the west toe of the coulee that had been created by the dumping of mine wastes.

Approximately 400 linear feet above the end of the reconstructed channel, a side coulee enters Mining Coulee. An earthen dam had been constructed in Mining Coulee just above where the side coulee enters. This dam held a pond behind it that was approximately 300 feet long, 30 feet wide, and 2 feet deep. There was approximately 3 feet of sludge on the bottom of the pond. Two adits opened into the pond and water and sludge were backed up into the mine workings.

There were five more adits in Mining Coulee above the pond. It is thought that these openings were created by subsidence occurring where mine workings near the surface crossed under or ran alongside the coulee. Two of the subsidences extended across the coulee bottom, diverting surface runoff into the mine workings.

On the west slope of the coulee there were two subsidence holes, two small coal slack piles, and two closed adits from which acid mine drainage was seeping.

PROJECT PLANNING:

L. C. Hanson Company began preliminary surveys and planning for the project in the Fall of 1982. The general plan was to excavate a new Mining Coulee channel from the previously reconstructed channel into the pond and reconstruct the channel from there to a point above the last subsidence.

Excavation of the channel would include removal of the dam and pond sludge. Materials excavated would be placed as fill to flatten the west slope of the coulee, eliminating the channel created by waste dumping. Seepage collectors and drains to the channel would be

installed below the two seeping closed adits prior to depositing excavated materials.

Channel reconstruction would include backfilling the mine openings, placing concrete plugs, and installing a rock covered PVC liner to prevent runoff from entering the mine workings.

All coal waste, fill areas, and excavated areas would be graded and then treated with lime, topsoiled, and revegetated.

The project was advertised for bids in August, 1983. A construction Contract was awarded to Pankowski Excavating, Great Falls, Montana on August 26, 1983.

WORK DESCRIPTION:

The Contractor began mobilizing on September 13, 1983 and began work on September 14, 1983 with trenching for installation of the 4" PVC drain from the closed adits at the end of the previously reconstructed channel.

The Contractor began excavating the new channel using a Terex TS14 Scraper and Terex 8230 Dozer on September 15, 1983. The area of the new channel was very wet from seepage and water started to puddle in tire ruts on September 16, 1983. Work continued on the channel excavation using the scrapers and dozer until September 23, 1983 when the channel became too muddy. On September 29, 1983, the Contractor began excavating the channel with his 7500 Ford Backhoe and piling the material excavated on the bank. On October 3, 1983, he began using scrapers again after cutting a narrow channel through for drainage. The Contractor began placing rock lining on completed portions of the channel on October 4, 1983. The Contractor used the backhoe and dozer to shape the channel and on October 11, 1983 began loading scrapers with a backhoe.

On October 11, 1983, the Contractor temporarily opened the dam and on October 12 he installed pipes in the dam to drain the pond. The pond had drained completely on October 17, however, a steady stream of water continued to flow from Adit No. 7.

On October 27, 1983, the Contractor began excavating the channel through the pond area using a Cat 950 loader. Excavated material was loaded into the scrapers and hauled to the disposal area. The scrapers were replaced with a dump truck when it was determined that the acid materials were damaging the scraper hoist cylinders. The Contractor stopped work on the channel on November 2, 1983 due to problems caused by the continued flow from Adit 7.

A pumping system to divert the Adit 7 water around the work area was installed on November 18, 1983. Excavation resumed for one day on November 19, 1983. Winter weather then set in and a "Winter Shutdown" order, effective November 24, 1983, was issued. Liming and topsoiling operations had been performed simultaneously with the channel excavation as areas were completed. Most of the topsoil required for placement on the remainder of the site had been stockpiled on site prior to the winter shutdown.

A "Resume Work" order was issued effective May 16, 1984. Excavating through the pond area continued with water being pumped around the work area. The channel was rough cut through the pond on May 18, 1984. The Contractor rough cut the channel to the end of the project that evening with a dozer.

The Contractor began adit closing work on May 23, 1985. Concrete plugs were poured on the closed adits on May 30 and 31, 1984, using mobile continuous batch and mix trucks. The channel was reconstructed over the plugs, the PVC liner was installed on June 14, 1984 and channel reconstruction was completed on June 25, 1984.

The water flow from Adit 7 made it necessary to eliminate one PVC liner and replace it with rock lining. The Adit 7 closure was modified to allow continued flow. The Adit 6 closure was revised to an earth and rock plug.

Excavating Service constructed the Adit 7 closure between June 30 and July 3, 1984. Pankowski Excavating then completed the remaining channel shaping, rock lining, liming, and topsoil placement on July 9, 1984 and a "Stop Work" order was issued to allow for Fall seeding.

A "Resume Work" order was issued and fertilizing and seeding operations were started on October 18, 1984. Seeding was completed on October 23, 1984. Snow started on October 24 and delayed the start of mulching until November 5, 1984. Mulching was completed on November 7, 1984. Topsoiling, fertilizing, seeding, and mulching were completed on a small remaining area on November 29, 1984.

DISCUSSION:

One hundred and fifty-nine (159) calendar days were allowed to complete the project. The Contractor used one hundred forty-eight (148) days to complete the work.

The channel was constructed generally as planned. The alignment in the area below the dam was revised for a short distance to follow a rock outcrop. The channel section through the pond area was changed somewhat due to wet conditions.

The seepage collectors were constructed generally as planned. The concrete curbs were pinned to the rock slope with rebar due to continued crumbling of the rock.

The Contract called for lime to be provided by the Owner. Delivery problems caused delays for the Contractor. Change Order No. 2 provided compensation and allowed additional Contract time due to these delays.

The water flow from Adit No. 7 was not anticipated and Change Order No. 1 was issued to control the flow of water during construction.

The continued flow of water from Adit 7 caused additional expense for the Contractor. Change Order 2 also provided compensation for this additional expense and allowed additional Contract time.

The closure of Adit No. 7 was modified due to the water flow. The Contractor submitted a proposal to do the work which was approximately 4 times the amount of the Engineer's estimate. It was rejected after a more reasonable proposal was submitted by Excavating Service. Excavating Service constructed the closure. Pankowski Excavating was compensated for equipment idled during the Adit 7 closure and was also allowed additional Contract time under Change Order No. 3.

An additional adit, Adit No. 8, was discovered during construction and was backfilled. It was above the channel and did not require a concrete plug.

A small area of the channel near Adit 5 subsided during construction. The area was excavated open, no additional voids were found, and the area was backfilled.

COMMENTS:

The project was completed in conformance with the Contract Documents and L. C. Hanson has recommended acceptance of the project by the DSL.

Several pay item quantities were disputed throughout the Contract. The major items disputed were channel excavation, topsoil and borrow material, all to be measured based on the volumes of the hauling unit. The Contractor used scrapers to haul all of these materials and such things as mud, steep grades, engine problems, and materials greatly affected the loads of these scrapers. It is felt that the Contractor was sincere in his quantity claims because he had no real comprehension of the situation. I would recommend that measurement by the hauling unit be avoided whenever possible on future projects, especially when scrapers are used.

It is felt that the project could have been completed sooner and with fewer problems if the Contractor had had a qualified superintendent who understood the project, had used equipment which was more appropriate in size and type, had not been plagued with equipment breakdowns, and had generally been experienced with projects of this nature.

QUANTITY SUMMARY:

Area Reclaimed	6.6 Acres
Cost Per acre	$ 17,100.35
TOTAL COST	$112,862.29

NOTE: Detailed unit costs and complete quantity breakdowns are available in the project records.

- PHOTO SLIDE LOG -

SAND COULEE PHASE II PR 1888-G

1.	10-17-83	New rocklined channel looking upstream from Sta. 22+00. Topsoil haul road in background and backfilled Hole No. 2 at upper right.
2.	10-17-83	Cut through dam looking up the coulee.
3.	10-17-83	Looking upstream at drained pond, water flowing from Adit No. 7.
4.	10-17-83	Looking at drained pond from east bank.
5.	10-17-83	Adit No. 6 after draining pond.
6.	10-17-83	Adit No. 7 with water flow after pond draining.
7.	10-17-83	Adit No. 6 with stream flow from Adit No. 7.
8.	10-17-83	Looking downstream at project. Backhoe is at dam cut.
9.	10-17-83	Disposal Area No. 2.
10.	10-18-83	Scraper hauling channel excavation.
11.	10-18-83	New rocklined channel. Slopes pulled back on left side of channel.
12.	10-18-83	Looking upstream at project from above Disposal Area No. 1.
13.	10-18-83	Scraper dumping channel excavation in Disposal Area No. 2.
14.	10-18-83	Scraper dumping channel excavation in Disposal Area No. 2.
15.	10-20-83	Bank excavation on left bank Sta. 29+00± looking upstream.
16.	10-20-83	Scraper hauling channel excavation at Sta. 23+00±.
17.	10-20-83	Attempting to unload lime.
18.	10-20-83	Lime spreading. Equipment at Sta. 17+00±.
19.	10-20-83	Lime spreading. Equipment at Sta. 17+00±.
20.	10-20-83	Spread lime prior to blending. Stake is at Sta. 20+00 looking downstream.
21.	10-27-83	Excavating pond area sludge. Sta. 26+50±.
22.	10-27-83	Excavating sludge in pond area. Sta. 26+50±.
23.	10-27-83	Looking upstream at sludge in pond area. Sta. 27+00±.
24.	10-27-83	Looking downstream at pond sludge excavation at Sta. 27+00±.

25.	10-27-83	Pond sludge excavation at Sta. 27+50± looking upstream from right bank. Sludge turning to heavy mud water.
26.	10-28-83	Looking upstream from Sta. 25+50± at excavated pond area with mud water.
27.	11-1-83	Looking upstream from Sta. 26+00± at excavation of pond area.
28.	11-1-83	Looking upstream at channel from Sta. 26+00.
29.	11-1-83	Channel excavation in pond area.
30.	11-1-83	Channel excavation in pond area looking downstream.
31.	11-1-83	Channel excavation in pond area looking downstream.
32.	11-1-83	Spreading lime on right side of channel and on Holes 1 and 2.
33.	11-1-83	Spreading lime on right side of channel and on Holes 1 and 2.
34.	11-3-83	Looking southerly at project entrance. Area previously reclaimed in center of picture and cinder pile to north of project at lower left. Topsoil borrow area at back center of picture.
35.	11-18-83	Looking upstream at pipeline for dewatering, Sta. 26+00±.
36.	11-18-83	Pump platform and dam structure for dewatering at Adit 7.
37.	11-18-83	Dam structure and pump intake line at Adit 7.
38.	11-18-83	Pumping set up at Adit 7.
39.	11-18-83	Looking downstream at pump discharge into channel at Sta. 25+00±.
40.	11-18-83	Looking downstream at pump discharge pipe running through brush.
41.	11-19-83	Excavating mud in pond area, looking downstream. Pump discharge pipe along back.
42.	11-19-83	Looking upstream at pond area from Sta. 26+00±.
43.	11-19-83	Adit No. 6.
44.	11-19-83	Adit No. 7.
45.	11-19-83	Adit No. 7.
46.	11-19-83	Looking downstream at pond area.
47.	11-19-83	Adit No. 6 and roof of pump structure.
48.	5-17-84	Looking down coulee from Sta. 27+00±. Channel work access road on right and weeds growing in area topsoiled last fall at left.

49.	5-17-84	Looking up channel from Sta. 25+90±. Dewatering pipeline on left. Water flow from Adit No. 7.
50.	5-17-84	Looking up the coulee from Sta. 21+00±. Hole No. 1 at right edge of photo and Hole No. 2 at right center.
51.	5-17-84	Looking up the channel from entrance gate. Growth of weeds in topsoil.
52.	5-17-84	Looking downstream from Sta. 26+00±.
53.	5-17-84	Pumping at Adit No. 7.
54.	5-17-84	Water flow from Adit No. 7.
55.	5-17-84	Looking upstreamfrom channel in front of Adit No. 7.
56.	5-17-84	Weed growth on topsoil looking down coulee from Sta. 20+00.
57.	5-17-84	Looking up coulee from Sta. 20+50±. Topsoil stockpile on right.
58.	5-22-84	Looking down dozed channel above pond from Sta. 29+00±.
59.	5-22-84	Looking up dozed channel from Sta. 29+00.
60.	5-22-84	Looking down dozed channel from Sta. 30+60±.
61.	5-22-84	Looking up dozed channel from Sta. 31+00±.
62.	5-22-84	Looking upstream at Adit No. 6 on right and roof of pump structure at Adit No. 7, showing channel dozing above Adit 6 & 7.
63.	5-22-84	Looking downstream at water pond between Adits 6 & 7.
64.	5-23-84	Excavating at Adit No. 4.
65.	5-24-84	Adit No. 1 partially backfilled.
66.	5-24-84	Adit No. 2 partially backfilled.
67.	5-24-84	Adit No. 4 partially backfilled. Prior to compacting surface.
68.	5-24-84	Looking up coulee at Adit No. 1 and material excavated in front of it.
69.	5-24-84	Pushing rock into Adit No. 6.
70.	5-24-84	Dozing rock into Adit No. 6.
71.	5-24-84	Looking into Adit No. 7. Stream of water running on bottom.

72.	5-24-84	Pump intake at Adit No.7.
73.	5-24-84	Looking down channel from Adit No. 7 at water running in ruts while pump is running.
74.	5-25-84	Installing 6" steel pipe across channel below Adit No. 6 & 7. Looking at Adit No. 6.
75.	5-25-84	Backfilling pipe laid across channel below Adit 6 & 7.
76.	5-30-84	Backfilled Adit No. 3.
77.	5-30-84	Compacting backfill at Adit No. 1 with Pneumatic pogo and backhoe compactor.
78.	5-30-84	Compacted backfill in Adit No. 4.
79.	5-30-84	Compacting backfill in Adit No. 1.
80.	5-30-84	Compacting backfill in Adit No. 1.
81.	5-30-84	Wiremesh placed in Adit No. 5 with paint marks for one foot concrete depth.
82.	5-30-84	Placing wire mesh for Adit No. 1.
83.	5-30-84	Wire mesh placed in Adit No. 3.
84.	5-30-84	Concrete site mix truck beginning to pour plug at Adit No. 2.
85.	5-30-84	Concrete site mix truck pouring plug at Adit No. 2.
86.	5-30-84	Crew pouring plug at Adit No. 5.
87.	5-30-84	Crew pouring Adit No. 5 plug - paint marks for 1 foot concrete depth.
88.	5-30-84	Concrete truck pouring Adit plug. Adit No. 5 in front of truck.
89.	5-30-84	Adit No. 3 with plug poured.
90.	5-31-84	Adit No. 4 with wire mesh in place.
91.	5-31-84	Concrete mix truck backing up coulee - Adit No. 6 at left of photo.
92.	5-31-84	Concrete mix truck stuck between Adits 6 & 7.
93.	5-31-84	Chuck Henry Concrete crew shoveling concrete into place for Adit No. 1.

94.	5-31-84	Chuck Henry Concrete crew placing concrete at Adit 1 and using backhoe to push up slope.
95.	5-31-84	Finished concrete plug on Adit No. 1.
96.	5-31-84	Concrete mix truck beside Adit No. 1.
97.	5-31-84	Chuck Henry Concrete crew with pile of concrete waiting for backhoe to push into place at Adit No. 4.
98.	5-31-84	Hoe placing concrete at Adit No. 4.
99.	6-6-84	Adit No. 8.
100.	6-6-84	Adit No. 8 with 3 ft. tape.
101.	6-6-84	Adit No. 8.
102.	6-6-84	Backfilling over Adit No. 1 concrete plug.
103.	6-6-84	Backfilling over Adit No. 1 plug.
104.	6-6-84	Pushing material into Adit No. 2, Adit No. 1 at left.
105.	6-6-84	Using backhoe to spread material over Adit No. 1 concrete plug.
106.	6-6-84	Dozing channel between Adits 2 & 4.
107.	6-7-84	Dozing in channel. Adit No. 1 to left of dozer, Adit No. 5 at right side of photo.
108.	6-7-84	Adit No. 1 to left of dozer, Adit No. 5 at lower corner of photo.
109.	6-7-84	Pushing material over Adit No. 4.
110.	6-7-84	Looking down the coulee. Large rock is at edge of Adit No. 4.
111.	6-7-84	Looking down coulee at material pushed over Adit No. 1.
112.	6-7-84	Looking down coulee at grading. Rock point is Sta. 30+00. Adit No. 1 is at right.
113.	6-7-84	Caved area at Sta. 29+60±. (Collapsed after blade passed over).
114.	6-7-84	Caved area at Sta. 29+60±. (Excavated with backhoe.)
115.	6-7-84	Caved area at Sta. 29+60±.
116.	6-7-84	Caved area at Stat 29+60±.
117.	6-7-84	Right end of caved area at Sta. 29+60±.

118.	6-7-84	Looking up channel from Sta. 28+00±.
119.	6-8-84	Looking up channel from Sta. 26+00±.
120.	6-8-84	Looking up channel from Sta. 27+00±.
121.	6-8-84	Looking up channel from Sta. 28+50±.
122.	6-8-84	Looking up channel from Sta. 29+00±.
123.	6-8-84	Looking up channel at liner subgrade from Sta. 29+50±. (Rock Point is 30+00).
124.	6-8-84	Looking down channel from Sta. 31+20. (Stakes mark edge of liner.)
125.	6-8-84	Excavating anchor ditch for PVC liner - Sta. 31+20 right - looking down channel.
126.	6-8-84	Excavating anchor ditch for PVC liner - Sta. 31+20 right - looking down channel.
127.	6-8-84	Excavating anchor ditch on right side of channel.
128.	6-8-84	Excavating anchor ditch on right side of channel Sta. 29+80±.
129.	6-8-84	Excavating anchor trench on left side of channel, looking down channel.
130.	6-8-84	Excavating anchor trench on left side of channel, looking down channel.
131.	6-14-84	Rolling PVC liner base, thin layer of sand on surface. Looking up channel from Sta. 29+50±.
132.	6-14-84	Rolling PVC liner base. Looking up channel from Sta. 30+00.
133.	6-14-84	Compaced liner base looking up channel.
134.	6-14-85	Compaced liner base looking up channel.
135.	6-14-84	Rolling liner base, looking down channel from 31+20±.
136.	6-14-84	Rolling liner base, looking up channel.
137.	6-14-85	Rolling liner base, looking up channel.
138.	6-14-85	Rolling liner base, looking up channel.
139.	6-14-84	Liner base looking up channel from Sta. 29+30±.
140.	6-14-84	Beginning to unfold PVC liner at Sta. 31+20.

141.	6-14-84	Unfolding PVC liner.
142.	6-14-84	Partially unfolded liner looking down channel from Sta. 31+20.
143.	6-14-84	Looking up channel from Sta. 29+42 at unfolding of liner.
144.	6-14-84	Looking up channel from Sta. 29+60± at unfolded liner.
145.	6-17-84	Looking down channel at unfolded PVC liner.
146.	6-17-84	Looking down channel at unfolded PVC liner.
147.	6-14-84	Looking down channel at partially anchored PVC liner.
148.	6-14-84	Looking up channel at PVC liner.
149.	6-14-84	Placing fine cover sand on liner at Sta. 29+42±.
150.	6-14-84	Placing sand cover on liner.
151.	6-14-84	Cover sand placed on liner to 30+20± looking up channel.
152.	6-15-84	Blowing lime onto disposal area No. 1, looking NW.
153.	6-15-85	Blowing lime onto disposal area No. 1, Looking NW.
154.	6-15-84	Blowing lime onto disposal area No. 1, looking NW.
155.	6-15-84	Blowing lime onto disposal area No. 1, looking NW.
156.	6-15-84	Blowing lime onto disposal area No. 1 looking NE.
157.	6-15-84	Blowing lime onto disposal area No. 1 looking NW.
158.	6-15-84	Blowing lime onto disposal area No. 1 looking NW.
159.	6-15-84	Lime truck backed into disposal area No. 2.
160.	6-15-84	Blowing lime disposal area No. 2.
161.	6-15-84	Blowing lime disposal area No. 2.
162.	6-15-84	Blowing lime disposal area No. 2.
163.	6-15-84	Blowing lime disposal area No. 2.
164.	6-15-84	Blowing lime disposal area No. 2.
165.	6-15-84	Blowing Lime disposal area No. 2.

166.	6-15-85	Blowing lime disposal area No. 2.
167.	6-15-85	Blowing lime disposal area No. 2.
168.	6-15-84	Lime dust on brush to north of disposal area No. 2.
169.	6-15-84	Lime applied to channel banks looking up ponded area.
170.	6-15-85	Lime applied to channel banks looking up ponded area.
171.	6-15-84	Lime applied to channel banks looking up ponded area.
172.	6-15-84	Lime applied to Coal Slack area 26+50± right side of channel.
173.	6-15-84	Looking up channel at fine cover material on PVC liner.
174.	6-15-84	Looking down channel at lime applied to channel banks in old pond area.
175.	6-15-84	Lime spread along channel banks looking up channel.
176.	6-15-84	Looking down channel from Sta. 26+50±. Disposal Area No. 2 with lime.
177.	6-15-84	Looking down channel from Sta. 31+60 at channel with fine cover over PVC liner.
178.	6-15-84	Looking up channel at fine cover on PVC liner.
179.	6-15-85	Scarifying lime and blending - Disposal area No. 2.
180.	6-18-85	Placing topsoil disposal area No. 2.
181.	6-18-85	Aggregate cover rock placed on liner, looking up channel.
182.	6-20-84	Placing aggregate cover and pulling bank slopes.
183.	6-20-84	Looking downstream at completed aggregate cover on liner.
184.	6-20-84	Finishing rock lined channel - Sta. 29+00± looking downstream.
185.	6-20-84	Looking downstream at finished channel. Rock point is Sta. 30+00.
186.	6-25-84	Looking downstream at finishing of channel.
187.	6-25-84	Looking downstream at finishing of rock lined channel just above Adit No. 7.
188.	6-30-84	Looking upstream at lower access road and top of ramp into stream channel.

189.	6-30-84	Looking downstream at ramp into channel and lower access road.
190.	6-30-84	Looking downstream at work road in channel below Adit No. 7.
191.	6-30-84	Looking upstream at end of rock channel lining by Adit No. 7 - (Adit No. 7 at left behind large orange rock.)
192.	6-30-84	Adit No. 7.
193.	6-30-84	Rock borrow area onsite.
194.	6-30-84	Rock borrow area onsite.
195.	6-30-84	Rennick crew beginning excavation at Adit No. 7.
196.	6-30-84	Excavation by Rennick crew at Adit No. 7.
197.	6-30-84	Excavation by Rennick crew at Adit No. 7.
198.	6-30-84	Rennick crew constructing forms at Adit No. 7.
199.	6-30-84	Rennick crew constructing forms at Adit No. 7.
200.	6-30-84	Rennick crew constructing forms and placing wire mesh. Adit No. 7.
201.	6-30-84	Forms of closure of Adit No. 7.
202.	6-30-84	Placing concrete in forms for Adit No. 7 closure.
203.	6-30-84	Tamping and rodding forms at Adit No. 7 closure.
204.	6-30-84	Unfinished concrete in form at Adit No. 7 closure.
205.	6-30-84	Looking down on drain pipe through forms at Adit No. 7 closure.
206.	6-30-84	Drain pipe through forms at Adit No. 7.
207.	6-30-84	Top of completed wall in forms at Adit No. 7.
208.	6-30-84	Completed forms after concrete pour at Adit No. 7.
209.	7-2-84	Completed wall after stripping forms, Adit No. 7.
210.	7-2-84	Looking along top of wall at Adit No. 7.
211.	7-2-84	Upstream end of back side of wall in Adit No. 7
212.	7-2-84	Downstream end of inside of wall in Adit No. 7.
213.	7-2-84	Spreading and blending bentonite along wall base, Adit No. 7.
214.	7-2-84	Fabric in place, pipe under forms plugged with cap inside adit, collector pipes installed, Adit No. 7.

215.	7-3-84	6" PVC pipe carrying water from Adit No. 7.
216.	7-3-84	6" PVC pipe carrying water from Adit No. 7.
217.	7-3-84	Drain aggregate in Adit No. 7.
218.	7-3-84	Stockpiled drain aggregate by Adit No. 7.
219.	7-3-84	Adit No. 7.
220.	7-3-84	Completing placement of rock borrow, Adit No. 7.
221.	7-3-84	Completing placement of rock borrow and drain aggregate at Adit No. 7 looking upstream.
222.	7-3-84	Nearly complete closure of Adit No. 7.
223.	7-3-84	Closure of Adit No. 7, looking upstream.
224.	7-5-84	Looking upstream at grading flowline back to center of channel in former pond area.
225.	7-5-84	Looking downstream at grading to return flow line to center of channel in former pond area.
226.	7-5-84	Flow out of pipe from Adit No. 7 at right. Grading channel for drainage.
227.	7-6-84	Looking upstream at bank grading. (Haul road to topsoil in center.)
228.	7-6-84	Looking up topsoil haul road and side coulee after grading to remove access road.
229.	7-6-84	Looking downstream at bank grading. Channel rock stockpile in side coulee at right.
230.	10-18-84	Applying fertilizer with broadcast spreader.
231.	10-18-84	Applying fertilizer disposal area No. 2.
232.	10-18-84	Applying fertilizer near side coulee.
233.	10-18-84	Applying fertilizer by hand broadcast near side coulee.
234.	10-18-84	Looking up coulee. Side coulee coming in at left.
235.	10-18-84	Looking upstream at discing of fertilizer into soil. Sta. 14+00±.
236.	10-18-84	Looking north at discing, Sta. 17+00±.
237.	10-23-84	Looking upstream at Tom Earle Seeding with drill just above side coulee.

238.	10-23-84	Looking west at Tom Earle Seeding at Sta. 26+00±.
239.	10-23-84	Looking upstream at Tom Earle Seeding at Sta. 25+00.
240.	10-23-84	Looking SW at Hole No. 1 after seeding.
241.	10-23-84	Looking north at disposal area No. 2 after seeding.
242.	11-5-84	Mulch on disposal area No. 1.
243.	11-6-84	Looking upstream at mulching on east side of creek.
244.	11-6-84	Mulch at north end of project looking north.
245.	11-6-84	Rolling out straw mulch on disposal area No. 2.
246.	11-6-84	Spreading straw mulch on west bank just below former dam site.
247.	11-6-84	Looking downstream from just below former dam site at rolls of straw.
248.	11-6-84	Mulch spread on disposal area No. 1.
249.	11-6-84	Mulch spread on disposal area No. 1.
250.	11-7-84	Looking up side coulee at straw mulch spread on topsoil haul road and topsoil borrow area.
251.	11-7-84	Looking northeasterly at site after mulching.
252.	6-13-85	Grass and weed growth. Looking up coulee from entrance road.
253.	6-13-85	Grass and weed growth. Looking up coulee from access road.
254.	6-13-85	Grass and weed growth. Looking up coulee from Sta. 14+00±.
255.	6-13-85	Looking up creek channel from Adit No. 7.
256.	6-13-85	Looking down creek channel from just above Adit No. 7. Flow meter set up at right center.
257.	6-13-85	Grass and weed growth. Looking down coulee from Sta. 27+00±. Side coulee channel in foreground.
258.	6-13-85	Grass and weed growth. Looking down coulee from Sta. 25+50±.
259.	6-13-85	Grass and weed growth. Looking up coulee from Sta. 23+50±.
260.	6-13-85	Grass and weed growth. Looking down coulee from Sta. 23+50±.